

**Graduate Program Review Committee Report
University of Washington School of Pharmacy**

Visit: 8-11 January 2022

Review Committee:

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1. Executive Summary: This review covers the following training programs offered by the School of Pharmacy at the University of Washington (UW):

Master of Science (MS) in Pharmaceutics,
MS in Health Economics & Outcomes Research (HEOR*),
Doctor of Philosophy (PhD) in Medicinal Chemistry,
Doctor of Philosophy (PhD) in Pharmaceutics,
Doctor of Philosophy (PhD) in n Health Economics & Outcomes Research (HEOR*).

The School of Pharmacy (SOP) at the UW is consistently ranked among the top schools in the US in this discipline and has a strong reputation in graduate and professional pharmacy education. The last full program review of the graduate degrees was in 2010 and Dean Dr. Sean Sullivan was appointed in Fall, 2014. A School-wide strategic planning effort was completed and adopted for 2015-2021, and this will be refreshed in the coming year. The school has launched a combination of new faculty hires, expanded their laboratory space by about 25%, and started new research initiatives that all provide a sense of positive direction and momentum to the school's graduate training and research efforts. We summarize below the most important strengths and opportunities for improvement from observations of the review panel below. In the subsequent sections, we provide more specific details and recommendations focused on individual training programs and opportunities for growth.

The review committee finds that the School of Pharmacy offers high quality graduate educational opportunities that consistently meet or exceed all expectations of the UW's graduate school and has maintained a strong national reputation. The committee recommends a continuing status with a subsequent review in 10 years for all the degree programs. These graduate degree programs compare favorably with peer institutions and the graduates are highly sought after for their broad and rigorous training in fundamental research and scientific pharmaceutical principles. The priority should be to continue focusing on strong research training within the graduate degree programs in these areas, rather than chasing new trends.

Maintaining the school's infrastructure, instrumentation, and adequate research space remains a challenge for the school leadership, although recent progress and commitments to renovate space are encouraging. Identifying additional sources of student funding presents a third challenge and need for the school as they seek to expand access and retain top student recruits. Currently, the student funding model relies heavily on faculty-initiated research grants, putting an enormous strain on faculty research labs. As faculty retire and new hires replace them, this transition will require substantial effort to maintain the pace and quality of the research. Finally, the school and faculty seem strongly committed to enhancing diversity in student recruiting and faculty hiring. Outreach programs, policies and funding have been initiated to increase underrepresented populations and which over time should enhance the diversity goals of the school and intellectual life of the departments.

In addition to the degrees considered here, the school of pharmacy offers the Doctor of Pharmacy degree and PharmD concurrent degree options that are outside the current review scope, and a Master of Science in Biomedical Regulatory Affairs (MSRA) that was not a focus of this review.

* Degrees affiliated with the Comparative Health Outcomes, Policy and Economics (CHOICE) Institute

Strengths:

- High quality degree programs with good reputation and student placement
- Welcoming environment for students to pursue their degrees and careers as scholars, teachers, and administrators
- Nationally renowned faculty and excellent reputation of graduate programs and scholarship compared to peer institutions
- Strong mentoring and positive interactions between trainees and faculty mentors
- Appropriate courses and experiential learning to develop fundamental scientific skills
- High confidence that students will find positions upon graduation
- A strong tradition of student mentoring, multidisciplinary research and mutual support
- Uniform praise from students for the support of faculty and feel that funding is stable
- Student handbook is great resource to highlight
- Space continues to be a premium and the new resources will help

Areas for improvement:

- Lack of institutional support for graduate training, in terms of lack of tuition waivers, and dedicated first year stipend support
- Need to raise stipends, to compete with SOM and due to high cost of living
- Concern that some students are working multiple jobs to make ends meet
- Uncertainty in university commitment to providing adequate research space and faculty lines for a highly successful research enterprise and associated graduate degree programs that should be expanded – faculty hiring is central to any expansion plans
- The focus on DEI is “light” and does not address the realities of where we

are as a nation; DEI is not well integrated into training and research

- Need to clearly communicate the milestones & expectations for students and identify where to go if they have problems or concerns
- While there are student services in place to address mental health issues, students don't really know how to access those or what they are
- Although students feel connected to their immediate peers and faculty, more cross-departmental and cross-center interactions are desired
- While scientific skills are taught well, the hidden curriculum (e.g. communication, networking, preparing for the job market) could be improved
- Space needs to be well utilized and a long-term plan in place for renovations
- Additional datasets to support HEOR should be explored and targeted funding to support such datasets should be obtained
- Opportunity for more emphasis on F31 awards and diversity supplements
- Consider exploring undergrad teaching as a way to raise revenue and profile
- The turnover for program support staff has made it more challenging for students to be fully informed regarding all aspects of completing the program; however, this has not impacted graduation rates or time to completion of degrees

Opportunities:

- Excellent prospects for coupling endowed fundraising with training and research
- Strong ongoing support from industry partners for students and programs
- More uniform and transparent information sharing channels can enhance student experience
- Excellent environment to develop new programs and broader funding base

2. Review Process

The Charge Meeting for the UW School of Pharmacy Program Review was held. The charge meeting was scheduled for: Thursday, June 17th via Zoom video conference. (Please see the Appendix for a copy of the Charge Letter, together with documents and communications reviewed as part of the Review process.) All the review committee members were able to participate in the charge meeting together with representatives of the School of Pharmacy, UW Graduate School, Graduate School Council, Office of the Provost and UW Graduate and Professional Student Senate (GPSS). Subsequently plans for an in-person site visit were changed to a video meeting format by the graduate school, due to ongoing pandemic concerns. The Review Committee met on December 9th, 2021 and compiled a list of additional questions and information to supplement the pharmacy self-study document. These responses are included with the Program Review & Self-Study questions provided by the School.

The review committee was asked to consider the following questions as applicable:

- Are the unit's degree programs of high quality? Do they meet the UW's expectations of quality and reputation?
- How does the unit compare with that of peer and aspirational institutions in terms of educational programs and scholarship?
- How can the unit improve the quality of its educational programs and scholarship? What does the unit need to do to increase its national prominence and regional prominence?
- Do students, faculty and staff find the department a supportive and welcoming environment in which to pursue their degrees and careers as scholars, teachers, and administrators?
- Are students, faculty and staff from groups that are underrepresented fully included in the intellectual life of the department?
- To what extent do the unit's current facilities and building space meet their needs?
- To what extent is the unit preparing students at all levels for careers and future academic pursuits?

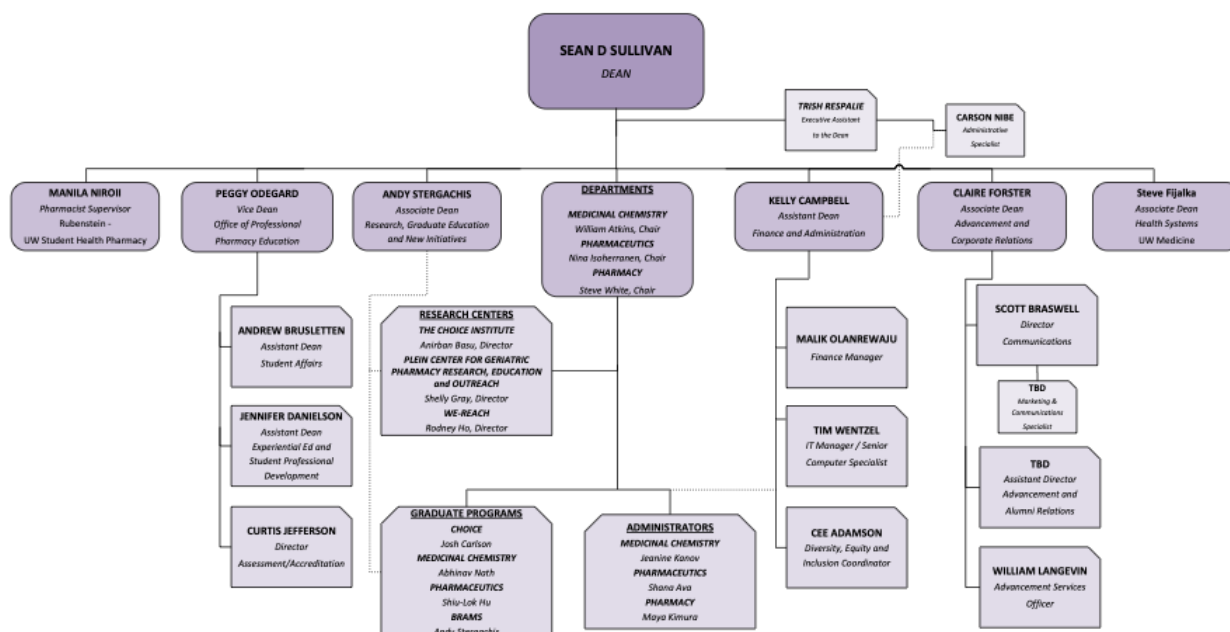
The Review Committee was provided with the UW Pharmacy Graduate Program Review and Self-Study document in early-December 2021. The schedule for the Site Visit was developed by the Graduate School, School of Pharmacy and Review Committee. The Review Committee conducted the Site Visit and Program Review on 8-11 January 2022, and prepared this report based on documentation and discussion prior to the Site Visit, together with findings from the Site Visit. This Report was completed and approved by all members of the Review Committee and was communicated to the UW Graduate School on 1 March 2022.

3. School of Pharmacy - Overview

1) Leadership

The School of Pharmacy is led by Dean Sean D. Sullivan, PhD, BScPharm, who assumed this role in 2014. Dean Sullivan has been with the University of Washington since 1992 and served as associate dean for research in 2010. A school strategic plan was initiated soon after Dean Sullivan started and released in 2015 proposing a 5-year roadmap for the school to expand its vision of being a global leader in pharmacy education, research, and service. Many elements of this plan were accomplished prior to 2019, and some were extended due to the pandemic; a new effort now is being started to revise and refresh the strategic plan for a few years, until a new Dean is identified in a pending search.

The remaining school leadership consists of chairs in three departments, Medicinal Chemistry (William Atkins, PhD, Chair), Pharmaceutics (Nina Isoherranen, PhD, Chair), and Pharmacy (H Steve White, PhD, BSc Pharm, Chair) 8 Associate / Assistant Deans and several councils and advisory group reporting into the office of the dean, departments and faculty council. An organization chart for the school is shown below.



Each department offers graduate-level training (Doctor of Philosophy and Master of Science, PHD, MS) and the Associate Dean for Research, Graduate Programs and New Initiatives (Andy Stergachis, PhD, BPharm) oversees those functions in a staff capacity. The Vice Dean for Professional Pharmacy Education (Peggy Odegard, PharmD) oversees the PharmD program, a professional degree program which is outside the scope of this review. The Department of Medicinal Chemistry offers a PhD in Medicinal Chemistry and provides instruction and conducts research in drug metabolism, drug design, bio-analytical chemistry and disease mechanism. The Department of Pharmaceutics offers a PhD and MS in Pharmaceutics with instruction and research on drug absorption, disposition and delivery. The Department of Pharmacy offers an MS and PhD in Health Economics & Outcomes Research (HEOR) and houses the CHOICE Institute where the HEOR graduate programs are found. The Department of Pharmacy is the school's largest department, providing instruction and research in therapeutics, pharmacy

practice, translational health, and health economics and outcomes. Each graduate program has a Graduate Program Director (who also serves as the graduate program coordinator) and a Graduate Program Advisor (staff advisor position). Pharmaceutics also has an advisory Graduate Program Committee. The school of Pharmacy does not have an undergraduate program although they have some limited undergraduate course offerings. To the extent that undergraduate courses provide a source of revenue and TA positions, the school may wish to consider exploring undergrad teaching as a way to raise revenue and attract prospective graduate students from other science disciplines on campus.

2) Organization of Faculty & Governance

The school faculty are largely organized around the 3 departments which have 57 full time faculty, 77 professional staff and 12 classified staff. The graduate degree programs mentioned above have about 67 doctoral students and 12 Master's students, and further advanced training is provided to about 20 postdoctoral scholars. The faculty and leadership in each department independently set admission, curriculum, retention, and graduation criteria for their MS and PhD degrees working with the graduate school coordinating education with a the School-wide Curriculum Committee. By virtually all measures the school has a highly distinguished faculty, who have international recognition for their scientific expertise, and who are extremely successful in maintaining grant and contract support for their research programs. The faculty continue to publish in high quality journals and maintain strong ties to the pharmaceutical industry and professional practice. The faculty also are resourceful in getting support from the private sector and developing revenue-generating services to support their research and training programs. The school continues to manage retirements of senior faculty, hiring some junior faculty over the past few years, and continuing to search for more new hires. Continuing this hiring is essential for a healthy distribution of faculty by rank across the School. The recruitment of both female and minority faculty members has been a school wide priority, which is notable as both groups are very highly recruited, and the available pool of candidates nationwide may be relatively small. Maintaining adequate resources in terms of space and start-up packages to recruit and retain these hires, remains an area of concern for the school.

The shared governance model for the School of Pharmacy, like many others at UW, consists of an executive council and faculty council, both of which are advisory to the Dean. The Dean's Executive Committee (EC) provides advice on a variety of issues, including the strategic direction of the School, instructional and research missions, budget and space allocations, policies, and planning for future growth. The EC consists of the Dean, the three Department Chairs, Associate Dean for Research and Graduate Programs, Vice Dean for Professional Pharmacy Education, Associate Dean for Health Systems (Chief Pharmacy Officer for UW Medicine), Associate Dean for Advancement and Corporate Relations, and the Assistant Dean for Finance and Administration. The Elected Faculty Council (EFC) is composed of elected faculty representatives from each of the three Departments and organizes quarterly all school faculty meetings. The EFC advises the Dean on matters of policy regarding faculty promotions and tenure, as well as curriculum priorities, resource and salary allocation, and budgets.

A Senior Leadership Committee (SLC) also is advisory to the Dean on the implementation of the School's Strategic Plan and the Diversity, Equity and Inclusion Plan that was adopted in 2017. The SLC is a liaison across the faculty, staff and student bodies, and administrative units throughout the University. SLC includes members of the Executive Committee, the EFC, and faculty, and graduate and PharmD student representatives. Additionally, the Dean's Advisory Council of Students (DACs) provides a forum for graduate students.

The school of pharmacy has assembled a strong and experienced leadership team with multiple Associate/Assistant Deans that provide coordinated implementation of school-wide professional education, policies, and initiatives. Coordination of graduate education is done by the Associate Dean for Research, Graduate Programs and New Initiatives. The three Department Chairs working with their graduate program directors are responsible for oversight of the individual graduate programs in the school and run these degree programs with their respective departmental faculty colleagues. The Department Chairs have wide administrative responsibilities overseeing teaching, faculty promotion, advancement, and recruitment, so they likely are stretched very thin to maintain their active research programs and associated NIH-funded training grants or program projects. It may be possible to lessen the strain on the chairs by appointing an Associate Chair for research and graduate education at the department level, mirroring the Associate Dean role in the school. Although students feel connected to their immediate peers and faculty, more cross-departmental and cross-center interactions are desired to provide better integration of the degrees. In addition, they can help the graduate program director to clearly communicate the milestones and expectations for students and address problems or concerns. Adding this administrative capacity at the department level could facilitate this integration across the school.

3. Students

The graduate degree programs in the school of pharmacy consistently attract high quality students to both the PhD and Master's training programs. The degree programs provide a welcoming environment for students to pursue their degrees and careers. The programs have nationally renowned faculty and maintain an excellent reputation for scholarship compared to peer institutions. The curriculum offers a range of appropriate courses and experiential learning to develop fundamental scientific skills, and practical knowledge.

Graduate students regularly publish their research findings in highly regarded scientific journals, win competitive research and travel awards, and seem highly sought after by employers for academic, industrial, and regulatory positions. Many applicants to the doctoral programs in the school are eligible for support on training grants or faculty research grants; occasionally industry sponsorship and fellowships also provide support. Student satisfaction regarding the degree program quality appears to be high, and students seem to express high confidence they will find positions upon graduating. All the degree programs share a strong tradition of student mentoring, multidisciplinary research and mutual support. The creation of a student handbook has provided a great resource to students and should be regularly maintained with inputs across departments. The handbook could be augmented with more uniform and transparent information sharing channels that can enhance student experiences.

While scientific skills are taught well, some “soft skills” (e.g. communication, networking, preparing for the job market) could be improved with central coordination. Providing opportunities for students to meet and talk with industry professionals could be one way to promote this goal.

The introduction of individual development plans (IDPs) for all students has encouraged deep conversations with mentors and added a consistent element to monitoring student progress and goals. This has fostered an environment of strong mentoring and positive interactions between trainees and faculty mentors. Several students expressed confidence that they were well-trained as independent researchers with up-to-date knowledge in contemporary areas of their disciplines. They also offered uniform praise for the funding support provided by faculty research and feel their funding is stable.

The current size of the individual graduate programs seems reasonable considering the funding base and number of graduate faculty to support them in each department. Any expansion will need more faculty or more student support resources. However, the faculty widely expressed concern that maintaining financial support for graduate students is extremely challenging. Many also felt that stipend levels remain inadequate to attract and support students in Seattle due to a high cost of living in the region. The committee heard concerns that some students are working multiple jobs to make ends meet, and competition with higher stipends in the school of medicine has stifled retention of top prospects. One urgent area of concern is the need to raise stipends to a level closer to those in medicine. Additionally, efforts should be made to address the lack of institutional support for graduate training, potentially in the form of tuition waivers, endowed fellowships, and dedicated stipend support for first year students who are taking more courses and have less research productivity.

The school leadership made commendable efforts to mitigate the impacts of the COVID-19 pandemic on graduate student learning and research. Plans for return to lab research were developed for each laboratory to enable continued student progress. Additional support for online meetings, community town halls and frequent check-ins between students and their advisors were provided along with a student emergency fund. Additionally, mental health support services were created in partnership with other schools in the health sciences. While we note that student services were in place to address mental health issues, in conversations with students they didn't seem to clearly know how to access the services or what was available. Perhaps further outreach efforts to explore the barriers to services, including ways to address stigma associated with accessing services, could resolve this issue.

3. Staff

The current hiring climate and budget constraints are stretching the administrative staff that support the graduate programs. This makes it challenging to recruit and retain experienced staff and to compete with other employers. Maintaining competitive salaries for staff can help with retention of key individuals. Most current staff seem highly capable and engaged, and likely do provide a great resource for the graduate programs and students. The turnover in program support staff has made it more challenging for students to be fully informed regarding

all aspects of completing the program. However, this does not appear to have impacted graduation rates or time to completion of degrees.

4. Space and Facilities

The school occupies approximately 62,000 square feet of space in the Health Sciences Building (HSB), mainly in four floors of the H-wing, with additional space in the D-wing and T-Wing of the HSB and in the South Campus Center (SCC). The H-wing is the administrative home for the school's graduate degree programs. HSB also has some wet laboratory and office spaces for faculty research and service activities found in other areas. Current wet laboratories permit a full range of cellular, molecular, and chemical studies for basic and translational research in pharmaceutical sciences. The school utilizes common classroom spaces HSB that are secured through a central reservation service and access to some dedicated classroom space and conference rooms for graduate courses.

The school recently added 12,800 square feet of space in the F-wing of the HSB, to address priority space needs, with approximately 80% of this space configured as wet labs. Space allocation plans for the newly allocated F-wing space were developed and adopted.

Renovation to modernize some of the new labs has already been started and the school has made a \$2 million commitment for improvements in the F-wing space. Additionally, the school is contributing to construction of the Health Sciences Education Building (HSEB), which is slated to open in summer 2022 which will add 100,000 square-feet of teaching, and meeting capacity to the HSB complex. The HSEB will house multiple large to small active learning classrooms and student study spaces.

New space remains a critical component of ongoing institutional support for the school and its training programs. The Dean has made commendable headway in finding and funding renovations of space for the school, although the University must continue to support this effort to address ongoing space needs. Uncertainty remains in university commitments to providing adequate research space and faculty lines for a highly successful research enterprise and associated graduate degree programs. Particularly, with the pending recruitment of a new dean, it would be helpful to have a commitment to the school that details specifics (square footage, location and timeline). These commitments also remain central to faculty hiring needs and any expansion plans goals. Utilization of space will need to be prioritized and a long-term plan put in place for renovations and funding. Ultimately the quality and future of this highly rated school, the graduate programs and internationally recognized research will depend on adequate facilities. While faculty and students do have access to an array of modern instrumentation, technology and core facilities also will require continued institutional investments in critical research infrastructure. The research and training programs likely will have limited ability to seek additional external funding or future expansion due to lack of adequate space.

5. Corporate relations & Advancement

The school of pharmacy makes extensive use of a Corporate Advisory Board (CAB), consisting of an external group of leaders from the pharmaceutical and biotechnology sectors. The CAB provides highly valuable advice as well as financial support and seems very committed to

advancing the schools research and graduate education. In addition to direct financial support for students, the CAB meets annually with faculty to discuss research strategy, curriculum development, and fundraising. CAB members also connect directly as mentors for graduate students and postdoctoral fellows. The connections between the CAB and school are an outstanding feature of the current strategy for growing the influence of the school. In particular, the CAB members seemed motivated to connect further with the faculty and students and prized the opportunities for engaging with new graduates and post-docs. The school has done a very good job of cultivating this unique resource of industry partners.

6. Graduate degree programs

Overall Evaluation

The review committee finds that the School of Pharmacy offers high quality graduate educational opportunities that consistently meet all expectations of the UW's graduate school and have maintained a strong national reputation. **The committee recommends a continuing status with a subsequent review in 10 years for all the degree programs.** These graduate degree programs compare favorably with peer institutions and the graduates are highly sought after for their broad and rigorous training in fundamental research and scientific pharmaceutical principles. A brief summary and further comments on each degree program are offered below.

Pharmaceutics: Master of Science (MS) and Doctor of Philosophy (PhD)

The Department of Pharmaceutics conducts research and teaching in precision medicine that is targeted towards improving patient therapy by maximizing drug efficacy while minimizing drug toxicity. This goal is achieved by understanding the processes, including drug delivery, that determine the exposure and pharmacological response to drugs. The areas of focus include genetic, environmental, physiological and disease processes that can alter absorption, distribution, metabolism, and elimination of drugs. The highly collegial Department faculty, students, post-doctoral fellows and staff pursue these multidisciplinary and translational goals through collaboration within the school, University of Washington campus and national and international institutions. Research and training programs involve biochemical and pharmacological laboratory techniques that span from molecular, cell- and organ-based studies to studies in humans and animals. Then, mathematical modeling and simulation techniques are applied to the data to individualize the right dose and drug delivery system for the patient.

The Pharmaceutics program provides students with a fundamental understanding of drug disposition, delivery and action. Faculty and students conduct research and teaching in precision medicine targeted towards improving patient therapy with competence in pharmacokinetic theory, modeling, drug delivery. and metabolism. Students emerge with knowledge of mechanisms of drug toxicity and transporters as well as drug-drug interactions. The program is well recognized for expertise in the latter areas, due in part to the web-based Drug Interaction Database (DIDB) that contains a large manually curated collection of qualitative and quantitative human in vitro and in vivo information related to various extrinsic and intrinsic factors for drug interactions and safety. The factors include co-medications,

excipients, food products, herbals, tobacco, organ impairment, and genetics, that can affect drug exposure in humans, which makes the DIDB a valuable resource utilized worldwide by pharmaceutical companies, regulatory agencies, researchers, and clinicians.

Based on overall metrics of productivity, research funding, publication record, and general impact in the field, the University of Washington School of Pharmacy graduate program in Pharmaceutics is an outstanding, top-ranked program. The department has 11 tenured or tenure-track core faculty, of whom 2 are assistant rank and 3 are associate rank. The department has 23 PhD graduate students enrolled in the degree program, 6 MS students, and about 6 senior fellows/ postdoctoral trainees.

The department of pharmaceutics continues to emphasize translational research with collaborations across many disciplines within and outside the UW. Considering the breadth of pharmaceutics, the shift towards translational research and projected future needs of the discipline, it may be appropriate for the department to focus mainly on areas of current strength (mechanisms of drug metabolism, transporters, and drug-drug interactions) as these basic core curriculum topics were seen by hiring managers on the advisory board as core strengths and principles of its PhD graduates. This approach builds on current success and offers significant synergy with the program in Medicinal Chemistry. In terms of expanding the scope of research and training, this must be balanced with concerns about diluting current research strengths. Exploring partnerships with other UW programs, such as biochemistry, toxicology, and bioengineering, may leverage the department resources and grow new opportunities. Hiring new faculty and developing new research aligned with the highly regarded training programs will remain a challenge without new resources to support them.

Medicinal Chemistry: PhD

Students in Medicinal Chemistry study drug metabolism, disposition, design, and disease mechanisms to develop insights into how drugs and toxins interact with biological targets and detoxifying enzymes that are critical to disease progression. The Medicinal Chemistry Ph.D. program aims to train independent research scientists. The department has a strong international reputation for excellence in drug metabolism research which is distinctive from some peer departments focused on drug design and synthesis. This distinctive feature remains attractive to potential employers. The committee heard industry collaborators say that they appreciate this emphasis on basic research and they like graduates who are familiar with drug metabolism research and can “hit the ground running.” The department and degree program have consistently been among the top 5 in national rankings by several important measures such as research productivity, publications, grant funding and student placements. The department has 8 tenured or tenure-track core faculty, of whom 2 are assistant rank and 4 are associate rank. The website lists 32 PhD graduate students in the degree program and about 10 senior fellows (postdoctoral) trainees.

While traditional departmental scholarship has focused on drug metabolism and toxicology, more recent efforts have focused on emerging areas. First, a systems biology approach to drugs and therapeutics has revealed a deeper mechanistic understanding of targets, genetics,

and modes of action. Second, some new therapeutics, including biologics, macromolecules, and vaccines, that require a deep understanding of viral and other immunization delivery approaches, have become topics for exploration. These emerging therapeutics and vaccines present substantially different production and delivery challenges than do traditional small molecule therapeutics, and require a different range of approaches to develop, deliver, and assess targets and mechanisms of action. While these new directions are being incorporated into the research efforts by the faculty and student training, the committee recognizes the need to retain the core strengths of the program. While the degree program continues to integrate these new efforts and research, maintaining traditional research and training strengths will help to prepare the best students for academic, industrial or government regulatory careers.

Health Economics & Outcomes Research (HEOR): MS and PhD*

The department of pharmacy offers graduate PhD and MS programs in Health Economics and Outcomes Research (HEOR) which are affiliated with the Comparative Health Outcomes, Policy, and Economics (CHOICE) Institute. The HEOR degree programs assess the health, cost outcomes and comparative effectiveness of health policies and medical interventions, integrating content from multiple disciplines across the health sciences including epidemiology, biostatistics, health services, policy, economics, and decision sciences.

The program faculty, and trainees conduct comparative effectiveness research, medication safety research and studies on the cost-effectiveness of healthcare interventions and health insurance. This work aims to estimate the value propositions of choices and improve decision making by patients, clinicians, and policymakers, creating a more personalized medicine experience. The program is patient-centered and relies on real-world evidence and data science, allowing students to explore pharmaco-economics. The pharmaceutical industry is showing increasing interest in comparative outcomes research, reflected by the opportunity to train additional PharmD students in HEOR by offering industry-supported fellowships. As with other graduate programs in the school of pharmacy, the HEOR training program is highly rated among peers nation- wide. This program has established itself as a leader in the field of pharmaceutical outcomes research.

The HEOR program has major strengths that include an internationally recognized faculty, substantial federal research support, high impact publications, and excellent employment prospects for students after graduation. Having the graduate program affiliated with a large and vibrant professional degree program and health sciences academic center with public health, medicine, nursing, dentistry, and social work provides a fertile and broad research environment. Similarly, research opportunities with colleagues nearby allied institutions such as the Fred Hutchinson Cancer Research Institute, Seattle Children's Hospital, Kaiser Permanente Washington Health Research Institute, and Puget Sound VA enriches this research and training environment. The CHOICE has 14 tenured or tenure-track core faculty, of whom 1 are assistant rank and 7 are associate rank (active recruitment is underway for another assistant professor position). The HEOR degree program has 18 PhD graduate students enrolled in the degree program, and 6 MS students, and about 8 senior fellows/ postdoctoral trainees.

An urgent need for researchers and students is access to large real-world evidence data sets, not just from publicly sources such as SEER-Medicare but also to include private sector administrative claims, EHR, and data generated from social media platforms, that can support the HEOR research efforts and continue to thrive and retain its prominence.

7. DEI contributions

The school of pharmacy has committed to enhancing diversity, equity, and inclusion (DEI) in its teaching, research, and service and aims to create a positive and collegial environment for all faculty, staff, and students. This commitment is stated explicitly in the school diversity plan. The first school of pharmacy diversity plan was approved by a majority vote of the faculty and staff in February 2010 prior to the current Dean. The current diversity plan was refreshed and adopted in 2017 to align with the UW's diversity blueprint and with the school's strategic plan adopted in 2015.

The school's graduate programs rely on the resources provided by various UW offices to assist with recruiting and retaining diverse students. The graduate programs consult with the Graduate Student Equity & Excellence (GSEE) program for best practices in recruiting and retaining traditionally underrepresented minority graduate students and use GSEE's Recruitment and Retention Guide as a resource. The graduate programs rely on GSEE to provide databases such as the National Name Exchange and California Diversity Forum to identify promising undergraduates from underrepresented backgrounds. especially those who have expressed interest in UW in relevant areas of science. Institutional support the Graduate Excellence Award and the Provost's PhD Fellowship Funds provide a foundation to recruit qualified underrepresented students. ARCS (Achievement Rewards for College Scientists) fellowships from private donations also can supplement graduate student stipends in the first year of study..

Specific outreach efforts in the school have been undertaken to reach underrepresented students, such as attending the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) meeting and the Annual Biomedical Research Conference for Minority Students (ABRCMS) meeting to enhance recruitment. Graduate students also have made presentations at local community colleges to build regional recruiting.

The revised DEI Plan from the school is an important step toward improving recruitment of underrepresented students. The review committee applauds the creation of a Diversity, Equity, and Inclusion Council (DEIC) to strengthen the school's DEI efforts. Engaging the DEIC members and providing them with access to resources such as travel funds, awards and scholarships potentially can serve as a focal point of the schools DEI outreach. However, the current approach on DEI is somewhat light in that it relies heavily on central UW resources. The school's DEI efforts could go further to address the needs and realities of where we are as a nation, by building toward future opportunities. One area of opportunity is to better integrate DEI into the robust research activities of the school by encouraging diversity supplements, offering to extend support packages for underrepresented students with school or department matching

funds and assisting with F31 and other fellowship options. Coordinating activities through the DEIC will enhance the focus on priorities identified in the School's Diversity Plan.

A similar coordinated approach to enhancing DEI could be applied in faculty recruitment. In addition to search committee training and targeted outreach in the search process, the school elements needed for a strong offer package early in the process. This also would benefit from support and coordination with resources from the Provost and central campus, which could be critical in enabling the school to achieve a more balanced and representative faculty. A comment offered to the committee was that the school may have lost out on potential hires who would have helped address both gender balance and diversity issues, because other schools were more agile and able to outcompete the UW. Even modest improvements in faculty recruitment could make a lasting difference for the school going forward.

8. Future Opportunities

As noted in the overall assessment and individual program sections of this report, the school of pharmacy at the UW has achieved national and international recognition for its research impact and remains among the top schools in this discipline. The school's strong reputation in research also extends to graduate and professional pharmacy education. The school now has entered a hiring phase as senior faculty retire and new faculty join with new research initiatives that provide a sense of positive direction and momentum to the school's graduate training and research efforts.

The school's graduate degree programs compare very favorably with peer institutions and attract top students who are highly sought after for their broad and rigorous training in fundamental research and pharmaceutical principles. The strong research training in the graduate degree programs should continue, seeking to build on past success and the established "brand" of the school. Maintaining the school's excellence also requires infrastructure, instrumentation, and adequate research space that remain a challenge for the school leadership, although recent progress and commitments to renovate space should be celebrated. Targeted fundraising by the school also can provide an opportunity to address these challenges by coupling endowed fundraising with training and research.

Identifying additional sources of student funding presents a third challenge and limits the opportunities for growth as the degree programs seek to expand access and retain top student recruits. Currently, the student funding model that relies heavily on faculty-initiated research grants puts an enormous strain on faculty research labs. The school's success in fundraising over the past few years suggests that a campaign to grow student fellowships and endowments may offer some help. In addition, as faculty retire and new hires replace them, this transition will require substantial startup investments and effort to maintain the pace and quality of the research enterprise. Finally, the school and faculty seem very committed to enhancing diversity in student recruiting and faculty hiring. Substantial progress is underway, with outreach programs, policies and funding initiated to reach underrepresented populations. Over time and with attention from school leadership these steps should advance the diversity goals of the school and departments.

9. List of site review documents and materials reviewed

Pharmacy_SelfStudy_2021-2022

Pharmacy_SupplementaryQuestions_2021-2022

Pharmacy_Facilities_2021-2022

Policy and Procedures for Allocation of Space_SOP_04 March 2020_final

Senior Leadership Committee Charter_27 Oct 2016

Pharmacy_Agenda_2021-2022-2

Graduate Program Awards Flyer_SOP_2020

Faculty Innovation Fund Announcement-SOP UW_2021

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Appendix A: School of Pharmacy Organizational Chart

Appendix B: CV's of SOP-Based Faculty with Appointments as Graduate School Faculty

Appendix C: Enrollment and Graduation Trends by Degree Program

Appendix D: Budget Summary

Appendix E: Diversity, Equity and Inclusion Plan

Appendix F: Curricula for Graduate Programs

Appendix G: Current Graduate Student Funding Models

Appendix H: Employment Outcomes

Appendix I: Graduate Student Handbooks

Appendix J: SOP Strategic Plan Accomplishments